



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/057,225 | 01/25/2002 | Leonard Forbes | 303.506US4 | 3248 |

21186 7590 08/28/2002

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER

TRINH, MICHAEL MANH

ART UNIT PAPER NUMBER

2822

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant(s)

10/057,225

FORBES, LEONARD

Examiner

Michael M Trinh

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2822

DETAILED ACTION

*** This office action is in response to filing of the Application filed on January 25, 2002.

Claims 1-30 are pending.

Duplication

1. Applicant is advised that, by incorporating all limitations of independent claim 1 into claim 4, incorporated claim 4 is identically duplicated that of claim 8. Therefore, should the indicated claim(s) be found allowable, the duplicate claim will be rejected under 35 USC § 101. One of the claims should be amended or cancelled to avoid the duplication.

Claim Rejections - 35 USC § 112

2. Claims 1-30 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Specification does not describe and illustrate the methods of the claimed invention as recited in claims 1-30. Specification does not describe and show encasing a portion of the body region with arsenic silicate glass (ASG) or BSG (claims 16-20,27-30). Specification does not describe and support as in claim 21 for how "...width that is sufficiently thin relative to a doping concentration (NA) of the body region such that a bulk charge (QG) is negligible in transistor operation...a threshold voltage for transistor depends only on a thickness of the first and second oxides and the width of the body region...". Specification does not describe and support "forming a first source/drain region on the substrate; vertically forming a body region with fully depleted structure on the first source/drain region..." (claim 21) together with claims 27-30 for "encasing a portion of the body region with arsenic silicate glass (ASG)" or "BSG". Specification does not describe "forming a first source/drain region on the substrate...vertically forming the body region on the first source/drain region...". Specification does not describe and support "...forming the body region...such that biasing the first and second gates fully depletes the body region..." (claims 4,8,23).

3. Claims 1-30 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Forming a first gate oxide prior forming a first gate on a first one of the

Art Unit: 2822

opposing sidewall surfaces of the body region, and forming a second gate oxide prior to forming a second gate on a second one of the opposing sidewall surfaces of the body region are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure since, in the absence of first and second gate oxide in the base claims 1,8,9,13,14, 20, and 21, forming the first gate and second gate on the sidewall surfaces would make and render the transistor being short circuit. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

4. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21, last two lines, "...the first and second oxides..." lack proper antecedent basis.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed features including silicon bulk substrate, vertically growing epitaxial layer, encasing ASG, BSG, etc., as recited in claims 1-30 must be shown or the feature(s) canceled from the claim(s). *No new matter should be entered.*

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will **NOT** be held in abeyance.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who

Art Unit: 2822

has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. Claims 1-13,21-26 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Noble et al (6,150,687).

Noble teaches a method (Figs 5A-12; col 7, line 50 through col 11) for forming a transistor on a substrate comprising at least the main steps of: forming a first source/drain region 212 on the substrate; vertically forming a body region on the first source/drain region, wherein vertically forming the body region 214 includes vertically growing an epitaxial layer and wherein the body region includes opposing sidewall surfaces (Figs 5A-5F; cols 7, line 50 through col 8); forming a second source/drain region 216 on the body region; forming a first gate 206 on a first one of the opposing sidewall surfaces with a first gate oxide therebetween; forming a second gate 208 on a second oxide of the second one of the opposing sidewall surfaces with a second gate oxide therebetween (col 9), wherein forming first source/drain region by ion implantation, epitaxial growing or combination thereof (col 7, lines 50-67).

8. Claims 14-20,21,27-30 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Forbes et al (6,097,065).

Forbes et al teach a method (Figs 4A-4o;1B-1H; col 9, line 60 through col 12; col 5-8) for forming a transistor on a substrate comprising at least the main steps of: vertically forming a body region extending outwardly from the substrate, wherein vertically forming body region includes forming the thin body region as a fully depleted structure, wherein vertically forming the body region includes opposing sidewall surfaces; forming a first source/drain region adjacent to the body region; forming a second source/drain region adjacent to the body region; forming a first gate (e.g. 160 in Fig 1D;463A,464B in Fig 4N) on a first one of the opposing sidewall surfaces with a first gate oxide therebetween; forming a second gate (e.g. 161 in Fig 1D; 463B, 464A in Fig 4N) on a second oxide of the second one of the opposing sidewall surfaces with a second gate oxide therebetween, wherein forming first source/drain region by CVD deposition of ASG or BSG, and then annealing (col 6 and col 11).

Art Unit: 2822

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

9. Claims 1-30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of U.S. Patent No. 6,320,222.

Although the conflicting claims are not identical, they are not patentably distinct from each other because Patent claims also include and recite a method for forming the dual-gate transistor on a substrate (e.g. claims 21 and 1-14 of Patent No. 6,320,222). Employing the method of the Patent claims for forming the transistor by the claimed method in the present application is apparent and would have been obvious to skill artisan, wherein scope of the claims of the present application is broad enough to encompass the scope of patent claims 1-22 of Patent No. 6,320,222.

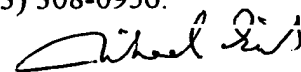
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (703) 308-2554. The examiner can normally be reached on M-F from 8:30 Am to 4:30 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Whitehead Jr Carl can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs



Michael Trinh
Primary Examiner